ABSTRACT

Improved focusing of waves is accomplished by compensation for attenuation effects in a medium. The invention is a combination of a method of attenuation leveling to allow operation over uneven surfaces and a method of signal compensation for attenuation that varies with frequency. This combination allows effective focusing of wide band wave signals that operate through irregular surfaces that cause uneven attenuation effects. Apparatus is provided to implement this method in clinical applications and research applications. Spatial attenuation leveling is accomplished with material that attenuates like the body part to be imaged. Compensation for attenuation that varies with frequency is provided by electronic modification of signal waveforms. Applications in the field of ultrasonic imaging in human tissue are specifically discussed. The apparatus includes conformal surfaces that are in contact with a patient's body that serve to prevent direct contact of the body with the attenuating material. It also includes fairing surfaces that modify shape of a patient's body to enable scanning of surfaces. Alternate devices include stand-off devices and immersion configurations.